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## CLEAN GRAIN . . . To Help Eliminate Waste, Increase Profits

### THE SITUATION:

Insects, rodents, and birds that get into stored wheat cause enormous losses. (Insect and rodent damage to grain amounts to an estimated \$250,000,000 per year). They waste the Nation's food, and eat away the profits of producers, handlers, warehousemen, and processors. Persons who store this essential food grain can help themselves by making sure that all the wheat they store is clean.

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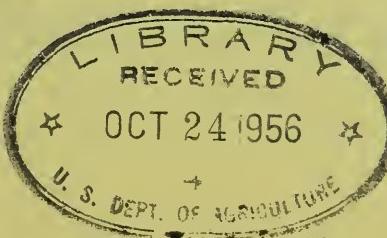
### WHAT'S BEEN DONE

The U. S. Department of Agriculture's Commodity Stabilization Service is advising wheat farmers that if they plan to put wheat under the 1955 price support program, their grain must meet the Food and Drug Administration's minimum sanitation requirements. (Under the FDA program, wheat does not meet minimum standards for food use if: (1) It contains more than two rodent pellets per pint, or comparable amounts of other contamination, or (2) it contains 2 percent or more, by weight, of kernels visibly damaged by insects). All wheat must meet these minimum sanitation standards when entering commercial channels for human use.

The State Extension Services have organized State and regional grain sanitation committees in wheat-producing States, and have greatly intensified their educational programs, including use of press, radio, TV and other informational media. Farmers' meetings and grain sanitation schools for elevator operators, grain handlers and processors, and educational work with youth groups on grain sanitation problems and control measures have been found effective by the Extension Services.

Educational work of this nature was carried out in most States last year, with heaviest effort in the 19 major grain producing States. Oklahoma, for example, held 119 meetings attended by 17,000 persons; 700 of Missouri's 1,100 grain buyers attended grain sanitation schools; Nebraska held 45 farmer and grain elevator operators' meetings on grain sanitation; 1,400 4-H Club members in North Dakota were enrolled in clean grain projects; and 35 of the State's 48 Future Farmers of America chapters conducted grain sanitation projects. Many leaflets and circulars on grain sanitation have been published and distributed in grain States.

USDA's Agricultural Research Service and Agricultural Marketing Service constantly are conducting studies into ways of controlling pests in stored grain.



WHAT FURTHER CAN BE DONE

Insects

Insects can spread into sound wheat when it is stored in infested or unprotected bins, mixed with contaminated wheat, or not treated at the proper time to halt infestation.

Wheat stored near feed supplies can easily become infested by insects in the feed. One truckload of insect-infested wheat can contaminate the entire storage capacity of a large elevator and make the grain stored there suitable only for livestock feed.

There are several things that can be done to protect farm-stored wheat from insects:

1. Reduce Insect Attacks in the Field. Although most wheat (and other grain) in the field at harvest time is free from insect infestation, the Angoumois grain moth attacks field wheat in regions where soft winter wheat is grown. This generally can be controlled by early harvesting. Getting the wheat out of the fields and into the bins early keeps the moths from getting a good start, and fewer insects are carried into storage.
2. Provide clean storage. Before storing wheat, get rid of insects living in the bin or near it. Clean up, remove leftovers of old grain, sweep down walls and floors. Use an insecticide.

For treating bins, sprays containing 2.5 percent by weight of DDT, methoxychlor, or TDE -- or containing 0.5 percent pyrethrins or allethrin -- have been found satisfactory. A farmer can buy one of these insecticides in the form of a wettable powder or emulsifiable concentrate. The label will tell him how much to mix with water to get a spray containing the desired percentage of insecticide.

Apply the spray to all surfaces inside the bin. Apply it at the rate of 2 gallons to 1,000 square feet. Use a garden sprayer or a power sprayer.

Sprays containing pyrethrins or allethrin in combination with a synergist (a chemical that increases the effectiveness of the insecticide) are available. If you use one of them, follow the manufacturer's instructions.

3. Keep Wheat Whole, Dry, Free From Dust. Bins should be made tight enough to keep out all rain or snow. Insects are attracted to high-moisture grain and breed in it much faster than in dry grain. A tight bin is essential also for effective fumigation. Wheat (or other grain) that is free from grain dust and broken kernels is safer from insects than dirty, cracked wheat.

4. Protect With Insecticides. Apply a protective spray or dust to the grain before it is stored or as it goes into the bin. Or fumigate the wheat after it is in the bin. The materials for this purpose are sold where other agricultural chemicals are sold.

Dusts for protecting grain contain 0.08 percent of pyrethrins and 1.1 percent of piperonyl butoxide (a synergist) in a wheat-dust carrier. They should be used at the rate of 75 to 100 pounds per 1,000 bushels of grain. Sprays containing synergized pyrethrum in a water or organic-solvent carrier are used at the rate of approximately 1.5 ounces of pyrethrins per 1,000 bushels of grain.

Fumigants are sold under various trade names, and the ingredients are shown on the labels. Follow the manufacturer's dosage recommendations. In fumigating, first level the surface of the grain in the bin. Then apply the fumigant as a coarse spray over the surface. Apply it evenly. Always apply the fumigant from outside the bin. Avoid inhaling the vapor. Avoid spilling the fumigant on the skin or clothing. If you get fumigant on your clothes, take them off immediately to prevent personal injury.

Fumigate within 2 weeks after binning in the South, or within 6 weeks in States across the central part of the country, from New Jersey to California. Farther north, fumigate when necessary to prevent insect buildup.

5. Inspect Frequently--Fumigate When Necessary. About every 30 days, take standard probe samples from the center of the bin and inspect them for insects. Sift the sample through a 10- to 12-mesh screen. The screen will hold back the grain, but insects will sift through. Fumigate at once if you find even one granary weevil, rice weevil, or lesser grain borer per quart sample, or as many as five insects of other kinds (such as flour and grain beetles, cadelles, or grain moths) per sample.

#### Birds and Rodents

To protect food grains from filth, they must be guarded against rodents and birds, which can contaminate them with droppings, hair, and feathers. Here is a brief summary of recommendations by the Fish and Wildlife Service, Department of the Interior, for dealing with these pests of stored grain.

Exclude Birds. Grain losses and contamination are caused by English sparrows, pigeons, and poultry, which frequently gain entry through ventilator openings of bins, cracks under eaves, broken windows, and open doors. Place 1/2-inch mesh hardware cloth over all windows and other openings. Keep doors closed.

Fight Rats and Mice. There are some rats and mice on nearly all farms. Each year they destroy or contaminate many million bushels of grain and feed. Rats may raise 4 or more litters a year, averaging 6 to 10 in a litter. The presence of one pair of rats on your farm in the spring can mean 50 rats by fall.

Community action is the most effective way to fight rats. Controlling rats on one farm in a community is only temporary. Even if a farmer rids his premises of rats, more may come in from surroundings where control is not practiced. Therefore, community campaigns should include not only farms, but dumps, feed mills, and other food sources in towns and villages.

To control these pests of stored grain on your farm:

1. Rat-proof storage structures. Close openings around foundations, doorways, utility lines, and bins with hardware cloth, sheet metal, or concrete. Replace broken windows and repair sagging doors or other structural defects. Rat-proofing is no better than its maintenance.
2. Clean-up. Good housekeeping is an essential part of permanent rat control. Keep the entire premises clean inside and out. Store lumber and other materials on racks at least 18 inches off the ground. Eliminate hiding and nesting places wherever possible. Clean up spilled grain, trash, and refuse that may be sources of food or shelter. A clean structure is unattractive to rodents and makes their removal easier.
3. Trap rats and mice. Wooden-based snap traps are effective for control of light infestations in portions of storage structures where poisons cannot be exposed, and as a follow-up to remove the remaining rodents after poison operations. For mice, bait with peanut butter or bacon. Since the range of mice is limited, place traps at about 10-foot intervals. No bait is necessary for rats--simply enlarge the trigger surface of the trap by means of a 2-inch square of cardboard or screen wire and place in runways so the trigger will be across the rodent trail. Use large numbers of traps.
4. Poison rats. Place attractive poison baits containing red squill, warfarin, or pival in and around grain-storage structures and adjoining installations. Red squill is recommended for quickly reducing heavy infestations of rats, but is not effective for mice. Warfarin and pival are effective against both rats and mice and are recommended for use in permanent-type protected bait stations to remove moderate and residual infestations and to destroy new invaders. Baits should be protected and replaced frequently with fresh material. Locate permanent feeding stations where rodent signs are prevalent, particularly along runways and harborages. Burn or bury all dead rodents to prevent grain contamination by rodent hair.
5. Gas rat burrows. Make periodic inspections of areas adjacent to buildings. Gas underground burrows outdoors with calcium cyanide, but avoid indoor use as this chemical is dangerous. Always close burrow openings with dirt after application of gas, and check within 24 hours for signs of renewed activity.

## OTHER GRAINS

While the Food and Drug Administration currently is emphasizing wheat sanitation requirements, insects do infest other stored grains and cause substantial losses in some areas. Listed below are suggestions to help keep such grains free of insects:

Corn -- In the South, field infestations by weevils, moths, and other flying insects are extensive. Where they do attack, they can be greatly reduced by planting varieties of corn least susceptible to insects in the field. Also, before corn is in the silking stage, infested grain or feed stored in nearby farm buildings should be fumigated or destroyed, and harvesting should be done early, so insects cannot get a start in the corn. In the Northern States, insects that infest corn in the field do little damage, since low winter temperatures kill the insects in crib-stored corn.

Rice -- Rice in the field is subject to the same species of insects that attack corn. To cut down these attacks, all old grain, feed, and sweepings in nearby warehouses, farm buildings, and grain storages should be fumigated or destroyed before the new crop of rice heads. Also, planting corn or sorghum near rice fields should be avoided.

Sorghum Grain -- The Angoumois grain moth is a common pest in the fields everywhere sorghums are grown. In the South, weevils and other flying insects also are troublesome. These can be controlled by eliminating sources of infestation in nearby farm buildings, by harvesting promptly, binning, and drying when necessary. Storing sorghum grain in the head is not a good idea, since whole heads are more subject to insect damage than the binned grain.

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## LIST OF AVAILABLE PUBLICATIONS

### Grain Storage

USDA Farmers' Bulletin No. 2071, "You Can Store Grain Safely on the Farm"

USDA Farmers' Bulletin No. 2076, "Storage of Ear Corn on the Farm in the North Central States"

### Grain Drying

USDA Leaflet No. 331, "Drying Shelled Corn and Small Grain with Heated Air"

USDA Leaflet No. 332, "Drying Shelled Corn and Small Grain with Unheated Air"

USDA Leaflet No. 333, "Drying Ear Corn with Heated Air"

USDA Leaflet No. 334, "Drying Ear Corn with Unheated Air"

### Insect Control

USDA Leaflet No. 345, "Insects in Farm-Stored Wheat -- How to Control Them"

USDA Farmers' Bulletin No. 1260, "Stored Grain Pests"

### Rodent Control (from Department of Interior)

Fish and Wildlife Service Circular No. 22, "Rats--Let's Get Rid of Them"

Fish and Wildlife Service Circular No. 13, "Rat Control Methods"

Fish and Wildlife Service Leaflet No. 349, "Control of House Mice"

Dept. of Interior Conservation Bulletin No. 19, "Rat-Proofing Buildings and Premises"

